REMARKS

The Examiner rejected claims 1, 3 and 4 under 35 U.S.C. 103(a) as being unpatentable over Poduska in view of Alappat et al and Wells et al ('840); and rejected claim 2 further in view of Cole.

In contradistinction to Applicants' claimed invention Poduska discloses an image generation device using dithering for preventing "banding", i.e., the appearance of sharp contrast between two different pixel intensity levels which are positioned adjacent each other. The dithering is performed during the rendering of the pixel intensities so that the image need only be computed at a smaller number of bits per pixel. High resolution input data is loaded into an input register 400, the data having an integer portion and a fractional portion where the integer portion is equivalent to number of bits per pixel of the lower resolution image. A dither value between 0 and 1, which may be retrieved from a dither matrix in a memory 500 and loaded into an interpolator register 450, is added (460) to the fractional portion of the input data with carry into the integer portion. The resulting integer portion is stored in an output register 480 for display on a lower resolution display. In other words if the high resolution image data is 12 bits per pixel and the lower resolution display handles 8 bits per pixel, the input data is separated into 8 integer bits and 4 fractional bits and 4 bit dither data is added to the input data. Then the resulting 8 integer bits per pixel are transferred to the output register for display.

Applicants' invention addresses image aliasing when a waveform, as opposed to a rendered image, is reduced in size from, for example, a 2048x2048 pixel display to a 640x480 pixel display. Rather than dithering intensity values, the present invention dithers x/y dimensional values. Therefore Poduska does not disclose an apparatus for image alias rejection of a high resolution rasterized waveform, but rather an apparatus for image banding rejection of a high resolution image. Poduska does generate a dither signal which is stored as

a dither matrix in the memory, but there is no indication that the dither signal is a shaped dither signal as recited by Applicants, such as an equivalent Gaussian impulse response. Applicants add the shaped dither signal to the dimensional values of the data points of the rasterized waveform, i.e., implements statistical filtering, while Poduska adds the dither signal to the intensity values of each pixel in the input image data, to produce filtered data point values. Applicants then subsample to produce a lower resolution rasterized waveform, while Poduska produces a lower resolution rendered image.

The Examiner cites Alappat et al as teaching a raster scan waveform display rasterizer for anti-alias pixel data, stating it would have been obvious to one of ordinary skill in the art to use the teaching of Alappat et al to provide the advantage of eliminating discontinuity, jaggedness or oscillation in the waveform display, as both Poduska and Alappat et al are directed to provide smoothness to an image. However Alappat et al address a different type of jaggedness or aliasing in displaying a waveform. In a digital oscilloscope a waveform is digitized into amplitude/time values and then converted to produce a rasterized waveform for display by minimizing the discontinuities caused by such discrete data points to give the appearance of a smooth analog waveform, i.e., what Alappat et al produce is the rasterized waveform which is the input to Applicants' invention. The issue in Alappat et al is not how to convert a high resolution rasterized waveform into a lower resolution rasterized waveform, but how to provide a smooth rasterized waveform from discrete, discontinuous data. Therefore the logical combination of Alappat et al would be to provide the input image data to Poduska for subsequent reduction of banding effects when a lower resolution pixel display is used, as indicated above. Even this is not logical because "banding" would not generally be a problem with rasterized waveform displays, and certainly is not the problem addressed by the present invention.

The Examiner further states that Poduska does not disclose shaped dither, but asserts that this is taught by Wells et al and therefore it would have been obvious to one of ordinary